

APPARATUS, ETC.

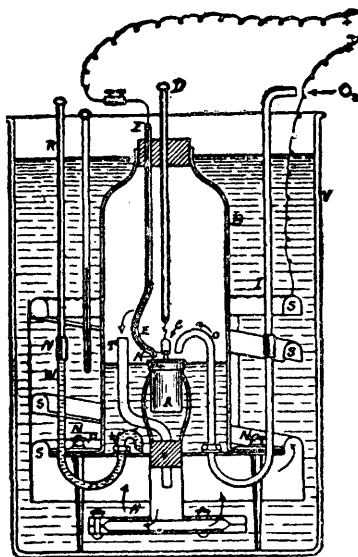
Boiling and Distillation of Foaming Liquids. R. Fanto. (*Zeit. angew. Chem.*, 1907, **20**, 1233-1234.)—In the distillation of liquids which show a tendency to frothing the introduction of a current of air against the surface of the boiling liquid entirely prevents the production of foam. When air is thus introduced above the liquid the temperature of the steam falls to 94° to 96° C.; in fact, if the current of air be heated to 105° C., no appreciable rise takes place in the temperature of the steam, but the rapidity of distillation is considerably increased. The destruction of the froth is due to the sudden condensation of the vapour inside the bubbles of foam.

The quantity of air necessary to produce a result depends on the intensity of the ebullition and the frothing tendency of the liquid. The greater the quantity of air introduced, the greater is the quantity of finely divided liquid carried over with the steam into the condenser, and it is necessary either to use a special trap or to redistil the distillate.

J. F. B.

Calorimeter for Volatile Liquid Fuels, Specially Adapted for Petrol.
W. H. Rawles. (*Journ. Soc. Chem. Ind.*, 1907, 26, 665.)—The calorimeter shown in the figure is a modification of that of C. R. Darling (*Engineering*, Sept. 21, 1906).

About 1.5 c.c. (1.2 grams) of petrol is placed in the brass lamp *A*, of 3 to 4 c.c. capacity, which has a jet of about $\frac{1}{16}$ inch internal diameter, fitted with an asbestos wick and a cap, *C*; this lamp is weighed before and after the determination. It rests in a tripod clip fitted to the main portion of the apparatus. The combustion chamber is constituted by the bell-jar *B*, of glass or copper; the neck of this jar is fitted with a rubber stopper, carrying a glass rod, *D*, by means of which the cap, *C*, is raised or lowered, and an electrical conductor, *E*, terminating slightly above, and about $\frac{1}{16}$ inch from, the jet of the lamp. The jar is held in place by the brass plate *P*, around which is accurately fitted a copper spiral, *S*, of arch section, terminating at the top in a ring of similar section perforated by small holes. The spiral and plate are held in position by nuts *N*, *N*, *N*; the whole fits loosely into the outer glass vessel *V*, containing 2,600 c.c.



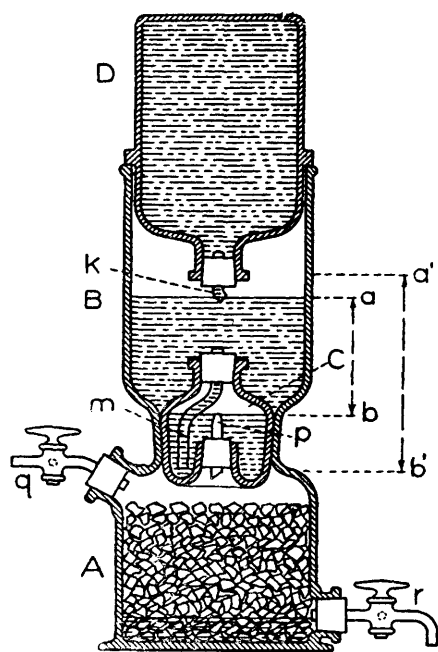
water. Oxygen is introduced through the glass tube *L* connected to the copper tube *O*; the quantity used should be sufficient only to just ensure smokeless burning of the petrol. The lamp itself is surrounded by about 100 c.c. of cold water, introduced into *B* by connecting a funnel to the tube *W*, which is then closed by the glass rod *R* until the combustion is complete, when the rod is removed and the water driven out of the jar and mixed with the water in *V* by the pressure of the oxygen. The hot products of combustion pass down the tube *T*, bubble up through perforations in the base-plate *H*, and pass upwards underneath the spiral copper arch *S*. Combustion of the petrol is started by a spark from *E* to the lamp; the combustion requires twelve to fifteen minutes, the rise in temperature being about 5° C. A correction may be made for the quantity of petrol (about 0.004 gram) which evaporates from the lamp between the first weighing and ignition in the calorimeter. The results obtained are stated to be within 100 calories of those given by a bomb calorimeter.

A. G. L.

Milk-Colorimeter. **A. Bernstein.** (*Chem. Zeit.*, 1907, 31, 727.)—A portable colorimeter for estimating the percentage of fat in skim milk consists of two glass

cylinders of equal diameter in a case. The cylinders are fitted with vulcanite stoppers, in the centre of each of which is fixed a stout rod of blue glass, extending downwards into the cylinder and forming an annular space therein. Four c.c. of the milk to be tested are mixed with 10 c.c. of 40 per cent. acetic acid, and placed in the annular space of one of the cylinders. The acetic acid dissolves the casein of the milk, and the opacity of the liquid is then almost entirely due to the suspended fat. If the apparatus is to be used in a dairy for controlling the efficiency of the cream separation, a standard liquid possessing the same degree of transparency as a milk containing 0.15 per cent. of fat is placed in the other cylinder. J. F. B.

New Portable Gas-Generator. A. W. Browne and W. J. Brown. (*Journ. Amer. Chem. Soc.*, 1907, 29, 859.)—The generator shown in the figure belongs to the

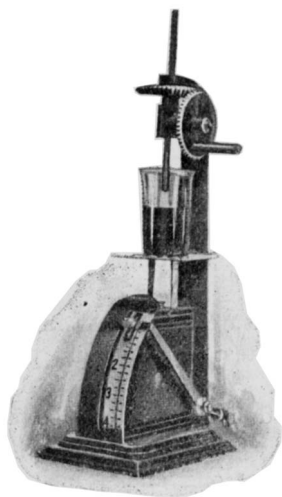
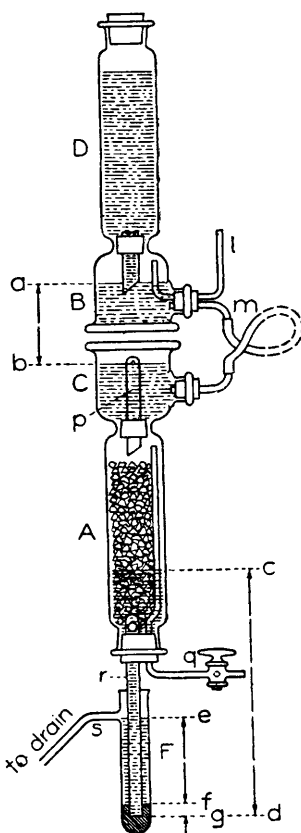


class in which the acid falls drop by drop on the solid, the spent solution being automatically removed and the gas delivered at approximately constant pressure. The generator consists of the constricted vessel AB, which contains the solid and a part of the acid; the hollow vessel C, which is ground so as to fit gas-tight into the constriction of AB; and the inverted bottle D, filled with acid, and loosely held in place by its flange. This bottle is closed by a rubber stopper, through which goes the bent tube *k*, terminating just below the level of the acid in B. The acid passes from B into A, when the stop-cock *q* is opened, through the bent tube *m*, placed in the upper stopper of C, and the short tube *p* in the lower stopper of C; *m* has a bore of 6 mm., whilst *p* is tapered at its upper end to a bore of 1.5 mm., so as to admit the

acid in drops; for the same reason the lower end of *p* is cut off at an angle. The spent liquid is discharged through the stop-cock *r*, or, preferably, through the mercury trap F, the pressure under which it is discharged being regulated by raising or lowering F, the exit tube *r'* remaining in the same position. The pressure at which the gas is delivered varies between the pressures represented by the columns of acid

$a\ b$ and $a'\ b'$. To introduce fresh acid, the bottle D is simply refilled; if the solid is to be replaced D is removed, m is closed by means of a rubber-tipped rod, the stopper carrying q is taken out, and the solid put in through the tubulus. A. G. L.

A Constant Pressure Gas-Generator for Use over a Wide Range of Pressure. A. W. Browne and W. J. Brown. (*Journ. Amer. Chem. Soc.*, 1907, 29, 864.)—The principle of the generator shown in the figure is similar to that described in the preceding abstract. The present generator is designed to deliver gas at approximately constant pressures, which can be varied at will from 5 to 270 mm. of mercury, by raising or lowering the acid reservoir D, which is connected to the receptacle for the solid A by means of the rubber tube m . Both vessels consist of ordinary drying towers, which should be so selected that in BD the tubulus is near the base of the tower, whilst in AC it is close to the constriction. In using the apparatus, care must be taken when the stop-cock q is shut off that there is not so much unused acid in A as to generate sufficient gas to completely fill C; otherwise acid may be ejected through the open tube l , which connects the interior of B with the air. Before D is refilled, m and l must be closed. A. G. L.



Scott's Glue-Tester.

(*Chem. Engineer*, 1907, 5, 441-442.)—The apparatus shown in the figure has a metal base, to which is fixed a balance and an upright standard, the latter bearing

a set of pinions which actuate a rack. To this is attached a vertical rod, which may be moved perpendicularly through a space of 5 or 6 inches, and which has a conical metallic head of definite area and angle. The beaker containing the glue jelly (prepared in the usual way) is placed in the pan of the balance, the pointer of which is set at the zero mark. The vertical rod is now lowered by turning the handle until the surface of the jelly is broken. This releases the pressure on the scale and the pointer springs back to zero, leaving an automatic indicator to show the force exerted at the breaking-

point of the material. The apparatus, which may also be used for testing tallow and soft waxes, is made by Sargent and Co., Chicago.

C. A. M.

Petroleum: Mixtures of Petroleum. (*Statutory Rules and Orders*, 1907, No. 483.)—This is an Order in Council directing that certain portions of the Petroleum Acts, 1871 to 1881, shall apply to mixtures of petroleum.

In the accompanying schedule are the following directions for testing petroleum mixtures:

1. *Liquid Mixtures*.—Where the petroleum mixture is wholly liquid, flows quite freely, and does not contain any sediment or thickening ingredient, such mixture shall be tested in the manner set forth in Schedule 1 to the Petroleum Act, 1879.

2. *Viscous and Sedimentary Mixtures*.—Where the petroleum mixture contains an undissolved sediment, as in the case of some metal polishes, which can be separated by filtration or by settlement and decantation, the sediment may be so separated and the decanted liquid tested in the manner set forth in Schedule 1 (*loc. cit.*). In carrying out such separation, care must be taken to minimise the evaporation of the petroleum. The separation of the sediment must not be effected by distillation.

Where the petroleum mixture is such that the sediment cannot be separated in the manner described, or where it is of a viscous nature, as in the case of indiarubber solutions, quick-drying paints, etc., such mixture shall be tested in an apparatus which differs from that prescribed in Schedule 1 (*loc. cit.*) only in the addition of a stirrer to equalise the temperature throughout the sample under test. In carrying out the test of a viscous petroleum mixture, the stirrer is to be constantly revolved at a slow speed, except when applying the test flame, with the fingers, the direction of revolution being that of the hand of a clock. The stirrer may be removed by grasping the spindle just above the blades with the finger and thumb, and unscrewing the upper sheath. The opening in the lid, through which the stirrer passes, may then be closed by a plug provided for the purpose. When this has been done, the apparatus shall be deemed to comply with the specification set forth in Schedule 1 (*loc. cit.*), and may be used for testing ordinary petroleum or solid petroleum mixtures.

A model of the apparatus will be deposited with the Board of Trade, and the provisions of Section 3 of the Petroleum Act, 1879, in regard to verification and stamping shall apply also to such apparatus as though it were the apparatus prescribed by the said Act. For the purpose of carrying out such verification the stirrer shall be removed and the opening plugged as described above. The apparatus shall then be tested with ordinary petroleum. The stirrer shall be verified by comparison of measurements.

3. *Solid Petroleum Mixtures*.—Where the petroleum mixture is solid, as in the case of naphtha soaps, etc., the apparatus to be used for the test shall be that prescribed in Schedule 1 (*loc. cit.*).

The method of carrying out the test of such solid mixture shall be as follows:

The solid mixture must be cut into cylinders $1\frac{1}{2}$ inches long and $\frac{1}{4}$ inch in diameter by means of a cork borer or other cylindrical cutter having the correct internal diameter. These cylinders are to be placed in the petroleum cup of the testing apparatus in a vertical position in such number as will completely fill the cup. The cylinders must be in contact with one another, but must not be so tightly packed

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as to be deformed in shape. Five or six of the cylinders in the centre of the cup must be shortened to $\frac{1}{2}$ inch to allow space for the thermometer bulb.

The air-bath of the testing apparatus must be filled to a depth of $1\frac{1}{2}$ inches with water. The water-bath is then raised to and maintained at a temperature of about 75° F.

The cup is then placed in the air-bath, and the temperature of the sample allowed to rise until the thermometer in the oil cup shows 72° F., when the test flame must be applied. If no flash is obtained, this temperature must be maintained constant in the oil cup for one hour, at the expiration of which time the test flame is again to be applied. If a flash is obtained, the solid mixture will be subject to the provisions of the Petroleum Acts in virtue of the Order.

Note.—It may in many cases save time in testing samples of petroleum mixtures to apply the test flame after the sample has been a few minutes in the cup and while still at the temperature of the room in which the test is being carried out, provided that this temperature is below 73° F. If a flash is obtained by this means, it is unnecessary to proceed with the test at a higher temperature.

